Method for transferring a feed strip of a material web onto a winding device

The invention relates to a method for transferring a feed strip of a material web, in particular a paper or board web, onto a winding device for winding the material web onto a spool, in which the material web or the feed strip is led over a carrier drum and a winding nip is formed between the carrier drum and the spool. It further relates to a winding device according to the preamble of claim 17.

Winding devices of the aforementioned type are known, for example from the documents DE 198 22 261 A1, DE 198 52 257 A1, DE 199 39 506 A1, WO 98/52858 and EP 0 483 092 B1.

The previously usual general sequence of a corresponding feed operation in a papermaking machine comprises the following steps:

- At the end of the drying section, that is to say on the last drying cylinder, the paper web is run at full width into the pulper.
- A strip is cut, for example by means of a tip cutter.
- The strip is taken off the last drying cylinder and transferred to a winding device or reel-up by means of a rope guide, vacuum tapes, air plate and/or the like.
- The strip is raised up and pulled tight.
- The strip is run to the full web width.

In this case, the clamping point used for the strip is the winding nip or nip formed between a carrier drum and an empty spool.

The line force in the nip is produced by pressing, the empty spool being pressed appropriately against the carrier drum or the carrier drum being pressed appropriately against the empty spool.

Pressing the empty spool against the carrier drum or the carrier drum against the empty spool is usually carried out by means of two hydraulic cylinders, one of which is provided on the operator side and one on the drive side and which are acted on with the same pressure. The result of the uniform pressing or identical pressing force on the operator side and the drive side is a nip which is closed over its entire width.

Moreover, in general a feed position has hitherto been provided on the rail or between the changeover position and the horizontal position on the rail. The distribution of the line force has hitherto generally depended on the following variables:

- level of the pressing force
- changeover position (changeover angle)
- rigidity of carrier drum and spool
- design of the surfaces of carrier drum and spool (steel, rubber covering, hardness)
- diameter of carrier drum and spool.

In this case, the distribution of the line force or pressure with respect to the center of the machine has hitherto always been symmetrical.

During the feeding or transfer of the feed strip, problems can occur in particular in the case of a rubber-covered carrier drum that has shrunk. For example, a carrier drum that has shrunk signifies a reduction in diameter. The nip force or pressure is lower at the relevant point, in the extreme case it being possible for the nip even to be open at the

relevant point, that is to say no longer fully closed. The transfer strip can then no longer be gripped.

The invention is based on the object of providing an improved method and an improved winding device of the type mentioned at the beginning in which the aforementioned problems are eliminated. In this case, the intention is in particular to ensure that the winding nip or nip is in every case closed at the point at which the transfer strip arrives.

With respect to the method, according to the invention this object is achieved in that the line force in the winding nip is set to a higher value in the region of the feed strip than in the remaining region of the winding nip during the transfer of the feed strip.

If the feed strip is led through the winding nip in one of the two lateral edge regions, then the line force is preferably set to a higher value in the relevant lateral edge region of the winding nip than in the other lateral edge region. In this case, the line force in the other lateral edge region can in particular even be set to the value zero.

According to a preferred practical refinement of the method according to the invention, the line force on the operator side and on the drive side of the winding nip is set to differently high values, being set to the higher value on the side of the feed strip.

The line force in the winding nip can be set, for example, via a movable or displaceable spool and/or via a movable or adjustable carrier drum.

If the line force in the winding nip can be set via a movable or displaceable spool, then, advantageously, the spool is pressed more firmly against the carrier

drum in the region of the feed strip than in the remaining region of the winding nip.

The spool can in particular also be set obliquely with respect to the carrier drum.

A stationary carrier drum is expediently used.

The feed strip can be fed to the winding device in the primary region or in the secondary region, for example. What is to be understood by such a primary and secondary region of the winding device is familiar to those skilled in the art and, for example, emerges from the documents mentioned at the beginning. For example, a new spool can be provided in the primary region and brought into a spool changing position, in which it forms a new winding nip with the carrier drum. For this purpose, for example, a primary transport device can be provided. Then, for example, a secondary transport device can take over the new spool with the started new wound reel.

The invention can therefore be applied, for example, in a winding device as is described in EP 0 483 092 B1 and in which the line force in the winding nip can be set via a movable or displaceable spool. The content of this document is hereby incorporated by reference in the content of the present application.

According to an alternative expedient refinement of the method according to the invention, the line force in the winding nip is set via a movable or displaceable carrier drum.

If the line force in the winding nip is set via a movable or displaceable carrier drum, then the carrier drum is preferably pressed more firmly against the

spool in the region of the feed strip than in the remaining region of the winding nip.

The carrier drum is expediently set obliquely with respect to the spool.

The spool can in particular be stationary or movable in order to compensate for the increase in the winding diameter.

The feed strip can be fed to the winding device either in the primary region or in the secondary region.

The invention can therefore in particular also be applied in a winding device as is described for example in WO 98/52858 and in which the line force in the winding nip can be set via a movable or displaceable spool.

By means of the method according to the invention, secure closure of the winding nip at which the feed strip arrives is ensured. In most cases, the feed strip will be supplied on the operator side. Corresponding reliable closure of the nip is achieved in particular by pressing more firmly at the relevant point of the winding nip, it being possible for the winding nip on the opposite side even to be opened, that is to say on the opposite side the line force can even be reduced to the value zero.

Care is therefore taken to have an asymmetrical distribution of the line force, it being possible in particular for the line force on the operator side to be different from that on the drive side.

On the side facing away from the feed strip, the carrier drum or the spool can be set obliquely. On the

side facing away from the feed strip, for example on the drive side, the result is then a zero line force.

For example, in the case in which the line force in the winding nip can be set via a movable or displaceable carrier drum, the procedure can be as follows, for example:

In order to open the side of the nip facing away from the feed strip, the carrier drum is set obliquely. This can be done as follows, for example:

- The carrier drum is moved away, for example hydraulically via cylinders for pressing the carrier drum on, it being possible for the position of the empty spool in the primary arm of the primary mounting to be fixed.
- Alternatively, the carrier drum can be moved away via an additional cylinder.
- The spool can be moved away, for example, via an electric drive, for example a servomotor or the like. The carrier drum on the relevant side can move against a stop.

The feed strip can be fed, for example, in the primary region (position of the empty spool fixed in the primary arm) or in the secondary region (position of the entry spool given by secondary carriage).

In the case of feeding in the primary region, the carrier drum can be moved away, for example hydraulically via cylinders for pressing the carrier drum on, on the side facing away from the feed strip, for example the drive side, which results in a corresponding gap. It is also possible for the carrier drum on the side facing away from the feed strip, for example the drive side, to move against a stop, which likewise again results in a corresponding gap.

In the case of feeding the feed strip in secondary region, the carrier drum can be moved away, for example hydraulically via cylinders for pressing the carrier drum on, on the side facing away from the feed strip, in particular the drive side, which results in a corresponding gap. It is also possible for the secondary carriage to be moved away on the side facing away from th efeed strip, for example the drive side, to such an extent that the carrier drum on the side facing away from the strip moves against a stop, which again results in a corresponding gap.

Even if the line force in the winding nip can be set via a movable or displaceable spool, the feeding can, for example, again be carried out in the primary region or in the secondary region of the winding device.

In the case of feeding in the primary region (empty spool clamped in the primary carriage/primary carriage movable relative to the primary arm of the primary mounting), for example the following steps are conceivable:

- The primary carriage is moved away, for example hydraulically, on the side facing away from the feed strip, for example the drive side, which results in a corresponding gap.
- The primary carriage is moved against a stop, which again results in a corresponding gap.

In the case of such feeding in the primary region, in general the spool holder can be opened somewhat.

In the case of feeding in the secondary region (empty spool clamped in the secondary carriage), in the present case of exerting a corresponding influence on the line force via the movable or displaceable spool, the procedure can be as follows, for example:

- The secondary carriage is moved away, for example hydraulically, from the carrier drum on the side facing away from the feed strip, for example on the drive side, which results in a corresponding gap.
- The secondary carriage is moved against a stop, which results in a corresponding gap.

In the case of feeding in the secondary region (empty spool pressed against carrier drum by means of secondary levers), the procedure can also be as follows, for example:

- The secondary lever is not applied completely, in order to obtain an appropriate gap.
- The secondary lever is moved against a stop in order to obtain an appropriate gap.

In the case of feeding in the secondary region, in the case of exerting an appropriate influence on the line force via a movable or displaceable spool, the procedure can therefore be such, for example, that the secondary lever or secondary carriage is not applied completely, from which it follows that the empty spool does not rest on completely.

The winding device according to the invention is accordingly characterized in that, in order to transfer a feed strip of the material web, the line force in the winding nip can be set to a higher value in the region of the feed strip than in the remaining region of the winding nip.

Preferred embodiments of the winding device according to the invention are specified in the subclaims.

The invention will be described in more detail in the following text using an exemplary embodiment and with reference to the drawing, in which:

figure 1 shows a schematic plan view of a winding device according to the prior art, in which a movable or displaceable carrier drum is pressed against the spool with equally high pressing forces on the two sides until the feed strip is transferred,

figure 2 shows a schematic plan view of a winding device according to the invention, in which the movable or displaceable carrier drum is pressed against the spool with a higher pressing force on the side of the feed strip than on the other side, in each case a pressing force greater than zero being produced on both sides, and

figure 3 shows a schematic plan view of a further embodiment of the winding device according to the invention, but in the present case the carrier drums being set obliquely, that is to say the winding nip on the side facing away from the feed strip being opened, so that the pressing force on this side is reduced to zero.

Figure 1 shows a schematic plan view of the winding device 10 according to the prior art, in which a movable or displaceable carrier drum 12 is pressed against the spool 14 with equally high pressing forces F_1, F_2 on the two sides during the transfer of the feed strip. The result is thus a symmetrical distribution of the line force LK in the nip or winding nip 16 formed between the carrier drum 12 and the spool 14.

Figure 2 shows a schematic plan view of an exemplary embodiment of a winding device 18 according to the invention for winding a material web, in particular a paper or board web, onto a spool 20, in which the material web or the feed strip is again led over a carrier drum 22 and a winding nip 26 is formed between the carrier drum 22 and the spool 20.

In the present exemplary embodiment of the winding device 18 according to the invention, the movable displaceable carrier drum 22 is pressed against the spool 20 with a higher pressing force F_1 on the side of the feed strip than on the other side. In the present case, a pressing force greater than zero is produced on the two sides in each case, which means that even the pressing force F_2 on the side facing away from the feed strip, which is smaller as compared with the pressing force F_1, is still greater than zero. Figure 3 shows a schematic plan view of a further embodiment of the winding device 18 according to the invention.

In the present case, the carrier drum 22 is set obliquely with respect to the spool 20, however, so that the carrier drum 22 is only pressed against the spool 20 with the pressing force F_1 on the side of the feed strip, while the winding nip 24 on the side facing away from the feed strip is opened by the amount a, so that the pressing force is reduced to zero on this side.

In the present case, too, the result is thus again an asymmetrical distribution of the line force LK.

Voith Paper Patent GmbH

List of designations

10	Winding device
12	Carrier drum
14	Spool
16	Winding nip, nip
18	Winding device
20	Spool
22	Carrier drum
24	Winding nip, nip
LK	Line force
a	Amount